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Preparation of Fruits and Vegetables for the Frozen Food Locker

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FREEZING FRUITS AND VEGETABLES FROM THE HOME GARDEN

MOST SATISFACTORY results in freezing fruits and vegetables from the home garden can be obtained by selecting the growing products in the cool of the early morning, completing the work of preparation and packing, and hurrying the packed containers to the freezer before the heat of the day. On a hot day many fruits and vegetables lose quality very fast after they are picked. Peas and sweet corn may lose one third of their original sugar content in a comparatively few hours.

Containers should be taken to the freezer within 2 to 3 hours after they are packed. If longer delays are unavoidable, the containers should be chilled in a refrigerator or with ice. Filled containers should not be held over-night under any circumstances before being taken to the freezer. Most frozen foods, when properly prepared and handled, are delicious, wholesome, and appetizing after 6 to 10 months in storage.

Ten Points on How to Secure the Best Results in Freezing Your Garden Products

1. Choose recommended varieties, if possible.
2. Use containers made especially for frozen food storage.
3. Pick the product in the cool of the early morning.
4. Remember that the proper stage of ripeness or maturity is all important. Pick as you would for immediate table use.
5. Handle and pack the product quickly, so that it reaches the sharp-freeze room within 4 or 5 hours after picking.
6. See that vegetables are adequately scalded. If water does not return to boil within 60 to 75 seconds you risk poor results.
7. Do not allow anyone to handle and pack the product until the hands are thoroughly washed in soap and water.
8. Have all utensils scrupulously clean and scalded before use.
9. Make sure that the containers are spread out when placed in the sharp-freeze room, to allow good circulation of air.
10. Check the temperature in the locker storage room to see that it is suitable for the products you intend to store.

HOW FREEZING DIFFERS FROM CANNING

The freezing process, unlike canning, does not sterilize the product, but the low temperature prevents harmful yeasts, molds, and bacteria from growing and developing. It is true that many of these micro-organisms are killed by freezing storage, but some survive. For this reason, cleanliness and sanitary methods in the handling of foods for freezing are just as important as in handling for immediate table use.

The Sharp Freezer

Any room maintained at a temperature of zero F. or lower and arranged so that packages may be spread out to facilitate the transfer of heat will provide satisfactory freezing conditions. Such a room is known as a sharp freezer.

A food product packed in pint or quart containers and placed in a freezing room at zero F. will not cool to a temperature of 5° to 10°

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above zero in the center of the package sooner than 8 to 12 hours unless a fan is used, in which case the time may be reduced by one half. Too much emphasis has been placed on the need for very rapid freezing, and too little on other factors of equal or greater importance, as listed on preceding page.

Containers holding fruits packed in sugar should be turned over once or twice, if possible, during the first few hours in the sharp freezer to prevent the sugar from collecting at the bottom of the container.

Storage Temperatures

The best results with most fruits and vegetables may be expected when a storage temperature not higher than 5° F. is maintained. Temperatures between 5° and 10° are reasonably satisfactory for many products for at least 6 months.

If the product is properly prepared and packed, little noticeable loss of quality may be expected with raspberries, blueberries, asparagus, peas, rhubarb, and cantaloup during the first 8 to 10 months at storage temperatures between 5° and 10°, but some deterioration in quality may occur after 5 to 6 months at such temperatures with strawberries, bush beans, Lima beans, and sweet corn.

Maintenance of a constant temperature is equally important and maximum fluctuations should not exceed four to five degrees.

CONTAINERS FOR FROZEN FOODS

Containers made for the purpose of storing frozen fruits and vegetables should be used, as others may be unsatisfactory. Glass jars with tight covers, such as used for canning, preserve these products well, but the jars are bulky and add to the cost of storage. For example, the average frozen food locker will hold about 100 pounds, drained weight, of cut corn packed in round glass jars; about 135 pounds when packed in cylindrical paperboard containers; and about 190 pounds when packed in rectangular cartons. For purposes of comparison it may be noted that a No. 2 can contains 13½ ounces, drained weight, of this vegetable.

The importance of conserving space through the use of rectangular containers is emphasized by the trend shown by manufacturers of mechanical refrigerators in furnishing storage space for frozen foods. Most of the newer medium-priced household models provide space to store 10 to 15 pounds of frozen fruits or vegetables when packed in rectangular containers. This is a great convenience to users of frozen food lockers. However, using glass jars and certain other containers may cut in half or more the amount that could be placed in the freezing compartment.

In the rectangular containers, the quart size will be found very suitable for most products except corn packed on the cob which requires a larger size. Quart containers of this type which measure less than 5½ inches in height may be placed in an upright position in the freezing compartment of several of the newer refrigerators, thus avoiding possible leakage due to defective sealing of the container when a sugar or sirup pack is used. A simple wooden form should be constructed to hold rectangular containers upright when they are being filled.

Capacity of Containers

A quart container will hold 24 ounces drained weight of dry-packed asparagus, cut corn, peas, Lima beans, cut bush beans, or about 21 ounces of cauliflower or spinach. This amount will provide 8 servings.

Cut corn requires about one third the space occupied by the same quantity of corn on the cob. A quart container of frozen cut corn will hold the equivalent of 8 medium to large ears of corn.

A quart container of frozen berries, cantaloup, or rhubarb packed in sugar sirup will hold about 20 ounces drained weight of fruit in addition to about 12 ounces of sirup. When packed in dry sugar, this size of container will hold 20 to 25 ounces drained weight of hulled berries or a similar weight of cantaloup or rhubarb cut into small pieces, together with 5 to 7 ounces of sugar. This provides from 8 to 10 servings.

PROCEDURE FOR PACKING FRUITS

Most of the fruits are best preserved when packed in sugar or in a sugar sirup. The amount of sugar to be used will depend on the sweetness of the product and on the family preference as to sweetness. In general, three to four pounds of the fruit to one pound of granulated sugar is about right. The fruit should be coated with dissolved sugar and fruit juice before being frozen. This is best accomplished by stirring the sugar and washed fruit together in a pan or large bowl before filling the container in which it will be frozen and stored.

Some fruits, especially red raspberries, are too soft to handle in this manner and are best packed in a freshly made sugar sirup. The sirup may be prepared by dissolving the right amount of sugar in clean, cold water and the sirup must be cold (or better, chilled with ice) when poured over the fruit. A space, one tenth the height of the container, should be left at the top for expansion. The amount of sugar must be varied to suit the fruit being packed, in most instances the least amount to use would be 4 pounds dissolved in 6 pounds of water, or 13 half-pint cups of sugar to one gallon of water. It is seldom desirable to increase the amount of sugar to more than equal parts by weight of sugar and water, or 19 half-pint cups of sugar to one gallon of water. Any sirup that stands at room temperature for more than 3 to 4 hours should not be used for this purpose.

The following amounts of sugar or sugar sirup are recommended for the various fruits, subject to slight modification as desired to meet individual tastes or preferences. Cantaloup and rhubarb, although generally classified among the vegetables, are included as they are handled for freezing in the same manner as fruits. Standard half-pint cups are used for measuring the quantity of sugar.

Kind of Fruit	Pack recommended	Amount of Sugar
Apricots (sliced)	sugar sirup	16 cups per gallon water
*Blackberries	" "	16 " " " "
*Blueberries	" "	13 " " " "
Peaches (sliced)	" "	19 " " " "
Plums (halved)	" "	25 " " " "
Prunes (halved)	" "	19 " " " "
*Raspberries	" "	16 " " " "
*Rhubarb (cut)	" "	16 " " " "
Cantaloup (cut)	dry sugar	1 lb. per 5 lbs. fruit
Sour Cherries (pitted)	" "	1 " " 3 " "
Strawberries	" "	1 " " 4 " "

* May be packed without sugar or sugar sirup for pies or jam making or for those who do not desire to use sugar. The dessert quality will not be so good as in the sugar or sirup pack. Dessert use refers to the use of the fruit without cooking.

VARIETIES OF FRUITS RECOMMENDED FOR FREEZING

These are varieties suitable for growing in Minnesota that have been tested for freezing. Undoubtedly there are other good freezing varieties not yet tested.

Blueberries

Any well-graded berries

Red Raspberries

Chief	Latham (preferred)
King	Taylor

*Strawberries**

Beaver	Premier
Dunlap	Tonka
Minn. No. 1192	
Gem (everbearing)	
Wayzata (everbearing)	

* The Catskill strawberry is inferior for freezing.

Apples—Sliced apples may be frozen after scalding in steam for 3 minutes but, for ordinary use, cellar or cold storage is preferred.

Black Raspberries—Most varieties freeze well but are considered too "seedy" for dessert use.

Cantaloup—A high quality cantaloup is one of the most delicious of all frozen products from the garden. The varieties Beauty Osage and Sunrise have given excellent results, but other firm fleshed varieties of similar type probably are equally satisfactory. The flesh should be cut into small cubes measuring one half to three quarters of an inch.

Peaches—Among the varieties commonly found on local markets the J. H. Hale is preferred for freezing. The Elberta also may be used satisfactorily. Peaches should be handled even more quickly than for canning to avoid browning. The usual procedure is followed of plunging the fruit into boiling water and then cooling quickly in readiness for peeling. The fruit should then be sliced directly into a cold sugar sirup, or dropped into water to which has been added about one teaspoonful of lemon juice per pint of water. A weak citric acid solution (½ to 1 per cent by weight) may be used in place of the lemon juice and water.

Plums and Cherry-Plums—Unsatisfactory for dessert use, but suitable varieties are very satisfactory for cooking. According to tests in progress at the Division of Home Economics, the following varieties of plums and cherry-plums are satisfactory for jam and preserves: Ember, Fiebing, Hennepin, Sapa, Superior, Underwood, and Minn. 218. Satisfactory varieties for plum jelly are: Elliot, Fiebing, Hennepin, Monitor, Superior, and Minn. 218.

Rhubarb—McDonald Crimson and Ruby are preferred because of their attractive color. Stalks should be cut into one inch lengths. NOTE—The freezing of fruits by commercial berry growers for the purpose of selling the product is discussed in a circular that may be obtained from the Division of Horticulture at University Farm, St. Paul.

PROCEDURE FOR PACKING VEGETABLES

Four distinct operations are required: (1) wash and prepare the product for scalding; (2) scald according to directions; (3) cool immediately and drain; (4) pack into containers (add no liquid). Cellulose-film bags should be heat-sealed with electric curling iron or heat-sealer.

Preparation for Scalding

Asparagus, Bush Beans—Prepare as you ordinarily would for cooking. Bush beans usually are cut into one inch lengths. Sort the

asparagus into medium and large sizes. Avoid iron utensils because these vegetables may be discolored from them.

Carrots, Cauliflower, Spinach—Prepare as you ordinarily would for cooking. Carrots should be diced. Cauliflower should be cut into medium-sized pieces weighing about 14 to the half pound.

Lima Beans, Peas—It is most important to pick these at right stage of maturity. Discard all hard, overmature specimens at the time of shelling. Small, poorly formed peas will not freeze well.

After scalding, the overmature specimens may be separated by means of brine flotation. This consists of pouring the product into a weak salt brine solution, adjusted so that the tender specimens will float and the overmature specimens will sink to the bottom. The right amount of salt must be determined by trial. For peas this will be about one cup of salt per gallon of water and for Lima beans about two and one half cups of salt per gallon, although the proper amount of salt will vary to some extent according to variety, season, etc.

Sweet Corn—Selection at proper stage of maturity is very important. It may take a little practice and experience to learn the proper stage of maturity, which is at the time that the kernels still exude milk when pressed but are starting to enter the "dough" stage. Remove the husks and silk, and trim the ends.

In most instances, it will be best to cut the corn from the cob because it is difficult to scald the center of the cob properly without over-scalding the corn itself and off flavors are apt to develop if the corn is packed on the cob and the whole ear is not thoroughly scalded. The corn should not be cut from the cob until after scalding. Cut corn requires one third the space occupied by the same quantity of corn on the cob.

SCALDING AND COOLING

Proper scalding is necessary for vegetables being prepared for freezing storage, except those to be packed in sugar or sugar sirup. This procedure is commonly but erroneously referred to as "blanching," a term which misstates both the purpose and effect of the treatment. The following scalding periods are recommended, beginning from the time the vegetable is first immersed in boiling water. The water must return to a boil within 60 to 75 seconds, otherwise it indicates that too little water is being used in proportion to the amount of the product—and longer scalding would be required.

*Asparagus, medium stalks	3 minutes	Broccoli	3½ minutes
Asparagus, large stalks	4 "	Carrots (diced)	2½ "
Bush beans, tender	2½ "	Cauliflower	4½ "
Bush beans, slightly mature	3½ "	Peas	2 "
Small Lima beans	3 "	Spinach	3 "
Large Lima beans	4½ "	*Corn (to be cut)	2½ "

*Corn (to be packed on cob)—small ears, 6 minutes; medium to large ears, 8 minutes.

Usually, on the average kitchen stove, not more than one pound of the product can be scalded at one time for each 8 to 10 quarts of boiling water used. A clean, well-tinned wash boiler (not used for washing) is useful for this purpose, or a 12 quart enamelware pail. The water used for scalding should be changed at frequent intervals if large quantities are being packed. As soon as scalding is finished, the vegetable should be quickly cooled in clean water, drained a few minutes, and then

* Scalding in steam preferred (increase time 25 per cent if steam used).

packed into suitable containers. Water should be used sparingly, or not at all, in cooling sweet corn to avoid sogginess.

Simple Test for Proper Scalding

The purpose of scalding vegetables is to inactivate certain substances in the plant (known as enzymes) that are responsible for hastening the deterioration of the product during storage. With most vegetables, except cut corn, a simple test will give a reasonably accurate indication as to whether scalding has been properly performed.

Take a clean test tube or any small glass vial or bottle such as used for olives for the 10 or 15 cent trade. Crush a small quantity of the vegetable between clean paper and place the crushed product in the bottle. With corn to be packed on the cob the sample should be taken from the center of the largest cob. Add enough clean water to cover the sample and then add about an equal quantity of ordinary 3 per cent hydrogen peroxide which is obtainable at any drug store. Shake vigorously. If scalding has not been done properly, tiny bubbles of oxygen will be seen rising to the surface of the liquid within a minute or two. Make this test on a sample of the unscalded vegetable to become familiar with the results to be expected from active enzyme action. This test is not dependable at all for the kernels of cut corn.

VARIETIES OF VEGETABLES RECOMMENDED FOR FREEZING

These are varieties suitable for growing in Minnesota that have been tested for freezing. Undoubtedly there are other good freezing varieties not yet tested.

Asparagus
- Washington

Beans (Green podded bush)
- Stringless Green Pod
- Giant Stringless Green Pod
- Stringless Green Refugee (1)
- Tendergreen

Beans (Yellow podded bush)
- Brittle Wax
- Pencil Pod

Green Lima Beans
- Burpee Bush (1)
- Fordhook Bush
- Henderson Bush
- New Philadelphia

Carrots
- Nantes Coreless, or other varieties of good quality and attractive inside color

Cauliflower
- White Mountain
- Snowdrift

Sweet Corn
- Golden Bantam
- Golden Cross Bantam
- Kingscrost Hybrid
- Minhybrid 202

Peas
- Alderman
- Dark Podded Alderman
- Giant Stride (1)
- Glacier
- Laxton Superb (1)
- Thomas Laxton
- Little Marvel
- Teton

Spinach
- Bloomsdale

Other vegetables—Among the vegetables that may be frozen satisfactorily but which are not commonly used in Minnesota for freezing storage are the following: Brussels sprouts, beets, beet greens, cabbage, kale, mushrooms, squash, Swiss chard, turnips.

Undesirable varieties—Among the varieties found to be unsatisfactory for freezing are: Stringless Black Valentine, Reliable Black Wax, Unrivaled Wax bush beans; Alaska peas. (1)

Vegetables Not Suitable for Freezing—Cucumber, Endive, Lettuce, Tomato.

Note—(1) indicates that the variety has not yet been tested in Minnesota but is classified on the basis of extensive tests elsewhere.

THAWING THE PRODUCT

The cooking of frozen vegetables should be commenced, if practicable, before the product is completely thawed. The cooking of corn on the cob should not be started until the cob is partially thawed. Most frozen fruits are at their best if served about the time that thawing is completed. Frozen fruit should be thawed in the original container which should remain closed. After thawing is completed, the fruit will keep about as long as sugared fresh fruit would remain in good condition. When the frozen foods are thawed they should never be refrozen.

The approximate time required to complete the thawing of frozen fruits and vegetables in pint or quart containers is given in the following table, together with the approximate time that the product may be expected to keep without significant loss of quality due to bacterial activity.

Where Held When Removed from Freezing Storage	Approximate Temperature	Time Required for Thawing	Time Product May Be Kept Without Significant Loss of Quality
Room temperature	68 to 75° F.	3 to 4 hours	6 to 8 hours
Ice box	45 to 50° F.	8 to 10 hours	24 to 36 hours
Mechanical refrigerator	40 to 45° F.	10 to 15 hours	36 to 48 hours
Ice cube compartment	15 to 30° F.		1 to 3 weeks

FREEZING AND STORAGE COSTS

The total cost of packing and storing fruits or vegetables from the home garden in a frozen food locker will depend to a considerable extent on the size and type of containers used, the charge made for freezing, the length of time in storage, and on whether or not service charges for the packing operations are included.

It is most economical to maintain a steady flow of products through the locker. Available records indicate a turnover of 2½ to 3 times the capacity of the locker during a year by the average locker patron. The following comparisons of cost are made for freezing and storing a vegetable such as cut corn, on the basis of a freezing charge of one cent per pound, storage of $10 per locker per year, and containers of one quart capacity. The costs shown include the cost of containers (except glass jars), but no allowance for the value of the product or for labor.

Type of Container	Approximate Capacity of Locker (lbs.) Net Drained Weight	Approximate Cost per Lb. Product	
		Storage 4 months	Storage 6 to 7 months
Glass jar (no charge for jar)	105	5¢	7¢
Cylindrical, paperboard	135	6½¢	8¢
Rectangular carton	190	5¢	6¢

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